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Mr. Spear's Report to the Local Government Board
upon the fatality from "Croup," and other Throat
Affections, in the Horwich Registration Sub-District.

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GEORGE BUCHANAN,

MEDICAL DEPARTMENT,

June 27th, 1889.

This district comprises the two urban sanitary districts of Horwich and Westhoughton, and one parish (Lostock) of the Bolton Rural Sanitary District. During the fourth quarter of 1887 and in 1888 a notable increase in the deaths from *diphtheria* was recorded by the Registrar General, so that the attention of the Board was directed to the matter. It appeared, however, upon my visit to the district that the majority of the deaths so classified had not been specifically registered, although afterwards recorded, under that head, but that most of them had been certified under the name of *croup*. It likewise appeared that an unusual number of deaths had been registered from "tracheitis" (a name used by one medical man at least in the district as a synonym of "croup") and "laryngitis," and it was obvious that such cases would have to be taken into account for the purpose of my investigation.

The relative prevalence of these fatal throat affections during recent years, the distribution in the three sanitary divisions of the registration sub-district, and the exact local nomenclature, are shown in the table subjoined:—

Period.	Regis- tration Sub- Dis- trict.	Horwich Urban Sanitary Dis- trict. Population (1881) 3,761; estimated (1888) 11,000.				Westhoughton Urban Sanitary District. Population (1881) 9,197; estimated (1888) 10,400.				Lostock Parish (Bolton R.S.D.). Population (1881) 782; estimated (1888) 800.				
		Total.	Diphtheria.	Croup.	Tracheitis and Cynanche Trachealis.	Laryngitis.	Diphtheria.	Croup.	Tracheitis and Cynanche Trachealis.	Laryngitis.	Diphtheria.	Croup.	Tracheitis.	
1884	3	—	—	—	—	1	—	1	—	—	—	—	1	—
1885	4	1	1	—	—	—	—	1	—	1	—	—	—	—
1886	6	1	1	—	—	3	1	1	—	1	—	—	—	—
1887	13	—	—	—	1	—	—	8	3	1	—	—	—	—
1888	27	1	3	4	3	3	3	10	—	1	—	2	—	—
1889 (First Quarter.)	4	—	—	—	1	2	—	—	—	1	—	1	—	—
Total	—	57	2	4	5	8	6	21	3	5	—	2	1	—

Exact clinical histories in these cases of "croup," tracheitis, and laryngitis were found to be very meagre. With one exception the subjects were all young children, and in the majority of cases medical attendance was only obtained a few hours before the fatal termination. In three cases of "croup," membrane is said to have been visible, either on the pharynx or on expectoration; laryngoscopic examination, so far as I could ascertain, was not made; nor was albuminuria sought for. In the more obvious general symptomatology little differentiation was found possible between these fatal affections, whether described as croup, tracheitis, or laryngitis. In most of the cases there was a history of malaise for some few days before medical aid was obtained, the child being commonly supposed to be suffering from

"a cold." At this time headache, sometimes pains in the back and limbs, slight sore throat and lassitude are chiefly spoken of. In a considerable proportion of cases swelling of the lymphatic glands or infiltration of the soft parts around the neck and throat externally was visible during the later stage of the illness, and in a few cases during the premonitory stage. Rapid discolouration of the skin of the throat and neck after death was several times remarked; but beyond this no *post-mortem* observation had been made. Upon the premonitory malaise spoken of above a condition of asthenia supervened, asphyxia then rapidly developing and proving fatal.

In 34 of the 38 fatal cases of croup, tracheitis, and laryngitis, registered as occurring during the last $2\frac{1}{4}$ years (*i.e.*, since the increased fatality is recorded), the duration of the illness, dating from first sign of indisposition, was stated as follows:—One day, 1; two days, 7; three days, 9; four days, 5; five days, 2; seven days, 4; nine or ten days, 2: in two cases the child had been ailing for two weeks and in two for three weeks before the fatal termination. Some 80 per cent. received medical treatment only within the last 24 hours, and many of these were seen only just before death. The disease, in fact, excited, as a rule, little attention until just before the end.

The record of such non-fatal cases of this illness as were reported afforded little assistance in an inquiry as to the exact nature of the disease. There were, indeed, few such cases; and these rarely in the same neighbourhood or apparently associated with the fatal attacks. In some half-dozen the history was that of diphtheria, but on the whole the testimony available from this source suggested that under the name of croup or tracheitis diseases of different etiology had been included, and the same observation applies to attacks ascribed to "laryngitis."

Referring again to the fatal cases, those that have occurred within the last $2\frac{1}{4}$ years may be classified according to the age of the sufferers as follows: I have included in one column those ascribed to "croup," "tracheitis," and "laryngitis" (regarding them as a whole as from ill-defined causes); the deaths specifically referred by the medical certificate to diphtheria are included in the lower column of the table.

Deaths registered from	Total.	Under 1.	1-3.	3-5.	5-7.	14 years.	Above 14 years.
Croup, tracheitis, and laryngitis.	38	1	20	13	3	1	—
Diphtheria	6	—	2	2	—	—	{ 1, 17 years 1, 34 years

The distribution of these fatal cases, as to time and place, is shown in the subjoined table:—

District.	Period.	Disease.	Total.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Horwich U.S.	1887	{ Croup, laryngitis, &c. Diphtheria	1	—	—	1	—	—	—	—	—	—	—	—	1
	1888	{ Croup, &c. Diphtheria	10	2	1	1	—	1	—	—	—	—	—	2	2
	1st Qr. 1889.	{ Croup, &c. Diphtheria	1	1	—	—	1	—	—	—	—	—	—	—	1
Westhoughton T.S.D.	1887	{ Croup, &c. Diphtheria	12	2	1	1	—	—	—	—	—	4	1	2	1
	1888	{ Croup, &c. Diphtheria	11	1	—	3	1	—	—	—	2	—	2	1	1
	1st Qr. 1889	{ Croup, &c. Diphtheria	2	1	1	—	—	—	—	—	1	1	—	—	1
*Lostock parish	1888	Croup	2	—	—	—	—	—	—	1	—	—	—	1	—
Whole district	2 $\frac{1}{4}$ years	{ Croup, tracheitis, laryngitis. Diphtheria	38	6	2	6	1	1	—	1	2	6	5	5	3
		Total	44	8	3	6	1	1	—	1	3	7	5	5	4

* No death was registered from diphtheria in this part of the district, nor any from croup or laryngitis during 1887 or the first quarter of 1889.



Except for the broad fact that Westhoughton was affected considerably earlier than the Horwich district no very noticeable incidence of the disease either as to time or place is apparent from this classification. As to family invasions, the main facts in connexion therewith may be thus stated. The 38 fatalities ascribed to "croup, tracheitis, and laryngitis" occurred in 35 different households. In 26 of these no other attack of any similar nature (either of croup, laryngitis, diphtheria, or noticeable sore throat), so far as could be discovered, had occurred, although there were living in these 26 households some 78 other children or young people. In the remaining nine households secondary cases occurred as follows:—

1. February 1887.—Child, aged 4, died from "laryngitis;" four other children of the family suffered about the same time from more or less severe sore throat (no subsequent paralytic symptoms observed).
2. March 1887.—Child suffered from bad sore throat; brother seized few days later and died from "laryngitis."
3. September 1887.—Children of same family, aged respectively 3 and $1\frac{1}{2}$ years, died within two days of each other from "laryngitis."*
4. November 1887.—One child, aged 3, died from "laryngitis"; another, aged 4, suffered in following week from "croup."
5. January 18th, 1888.—Boy, aged 14, died from "laryngitis"; three children of the same family suffered a few days later with similar symptoms.†
6. January 8th, 1888.—Child, aged 3, died from "diphtheria," the case being, I was informed by the medical man, quite typical; a sister, aged 2, died on February 25th from what was certified by another practitioner as "croup."‡
7. January 12th, 1888.—Child, aged 3, died from "croup"; another, of same family, aged 2, suffered from similar symptoms four days later.§
8. March 11th, 1888.—Child, aged 2, died from "croup"; another, of same family, aged 5, died on 5th October following, the death being ascribed to the same cause.
9. August 13th, 1888.—Child, aged 3 years, died from what was registered as "croup"; a week later the mother sickened and died on August 25th of "diphtheria"; the grandmother also who had assisted in nursing the child suffered from sore throat.

Of the six fatal cases of *diphtheria*, three were single ones (*i.e.*, there was no other case either of diphtheria, croup, &c., in the families invaded). Two others occurred in houses where deaths from "croup" also were recorded (cases 6 and 9 above), and the remaining one was associated with two mild attacks in the family invaded, and, probably, with two or three elsewhere. Unlike most of the cases of "croup," there was in certain of these cases of diphtheria some presumptive evidence of the spread of the disease by personal intercourse between the sufferers.

* These two children were both convalescing from measles, and a week earlier a child living in an adjoining house had died of that disease.

† This family, consisting of five persons, occupied an isolated farm house near Westhoughton. The boy was not known to have been exposed to risk of any infection; he sickened on January 14th, 1888, with headache, dizziness, sore throat, and quickly succeeding prostration. He died on the 18th, the throat symptoms becoming the most prominent, so that the death was certified as from "laryngitis." Within about a week three other young people at the house developed somewhat similar, although less severe, symptoms. Dizziness appears to have been chiefly complained of and slight sore throat; a mottled appearance of the skin, somewhat resembling urticaria, except that there was no elevation of the whitish patches, is likewise spoken of. No subsequent desquamation of the cuticle occurred, nor could I ascertain that there had been any symptom of paralysis. Twelve cows were kept on the farm at the time, the milk being chiefly used, except for a small quantity consumed by the family, in butter making; and the farmer states that shortly before and at the time of his children's illness three of the cows suffered from some feverish attack with "bad eolds." No sores on the teats were observed.

‡ This family lived at Horwich; the second child had been sent from home on the sister's seizure, and had only returned three days when she herself sickened. Clearly developed membrane and albuminuria are spoken of as distinguishing the first attack.

§ The two children (residing at Horwich likewise) had been accustomed to play near an open sewage gutter.

The above record includes all the cases in which multiple attacks of what could be regarded either as diphtheria or "croup" occurred, but there were several others in which attacks of measles and a few in which attacks of scarlatina were coincident with fatal cases recorded as "croup" or "laryngitis." This was specially noticeable at Westhoughton, where between September 19th and November 30th, 1887, measles prevailed so extensively that no less than 21 deaths from that cause were recorded. Between March 9th and September 26th of that year no death at Westhoughton from any of the throat affections in question was registered; and then in the next four days, four deaths from "croup" or "laryngitis" occurred in families in which, immediately before, or at the time, measles prevailed. The coincidence, it seems to me, is scarcely to be regarded as accidental.

Another and a very generally recognized pre-disposing cause to severe throat affections is excessive humidity and befoulement of the air available for respiration; and in that part of my report relating to sanitary condition I shall have to show that the inhabitants of the other locality specially involved in this prevalence of disease—the Horwich urban district—have of late been exposed in a marked degree, and from special circumstances, to unwholesome influences of this sort.

SANITARY CONDITION.

THE HORWICH URBAN SANITARY DISTRICT.

The town of Horwich is situated on the edge of the Lancashire coalfield, chiefly on clay soil and at the foot of elevated moorlands formed by the Mill-stone grit. Until recently it was a mere village. Including some 1,000 in outlying localities, the population of the district numbered only 3,761 in 1881. In 1885-1886 the Lancashire and Yorkshire Railway Company established extensive locomotive works, and trade generally received an enormous impetus. In his report for 1887 the Medical Officer of Health mentions that 578 houses were erected during that year; and in the following year 402 more were built. The population is estimated now to have increased to nearly 12,000.

The sudden large development was calculated to try the best sanitary organisation, and that of the Horwich Authority was evidently incapable of bearing the strain. In effect, whole streets and rows of houses stand in a perfect sea of mud and slush, sewage still trickles in foul gutters over the bare surfaces, and so little regard has been paid to the enforcement of the local building byelaws that important sanitary requirements in the construction of new houses have been habitually infringed. I will deal with these matters *seriatim*.

Streets and Roadways.—The main highway of the town, paved or macadamized, is in most places in a state of great dis-repair and full of holes, a condition which leads to much lodgment of moisture. Of some 70 to 80 private streets only five had, up to April 1889, been "metalled, paved, and channelled," although I was told that according to contracts entered into by the Authority 22 should have been completed in the previous October. Even these few completed streets, owing to the passage on to them of traffic from excessively miry surroundings, and to defective scavenging, were on my inspection only distinguishable from the rest by the absence of the deep ruts and holes into which the muddy surface of the latter had been ploughed. As to many of these latter, it is no exaggeration to say that access to the houses could only be gained by wading for considerable distances ankle-deep in slush, a mode of progress only occasionally to be avoided by the use of the insecure stepping stones which the inhabitants had laid down. Not only roadways, but various open spaces about the dwellings, are in this condition. To say nothing of the resulting discomfort, the unavoidable dirt of the houses, and of unwholesome exhalations, the excessive humidity that ensues must be regarded as a powerful predisposing factor in the causation of throat and lung diseases.

Sewerage, Drainage, and Excrement Disposal.—The main sewers, of a complete system of sewerage for the town itself, have now for some months been constructed. They are partly of brick and partly of pipes; are said to have a good gradient and are ventilated by open surface gratings. Large outfall tanks have been built some mile and a half from the town; and here, by the admixture of a solution of lime, it is intended that the sewage shall undergo a rough process of precipitation preparatory to its discharge into a neighbouring stream.

The main sewers of this system and the outfall works were completed in October last; private drains along the highways, sometimes it would appear the old imperfect stone drains, have been connected. As regards, however, the private cross streets, these are still for the most part unprovided with the necessary tributary sewers, and sewage is allowed to find its way into foul open gutters which intersect and still further disfigure the miry open spaces.

It is anticipated that the sewers in question will be used for slop water and liquid sewage only. For excrement disposal privy-middens are in universal use; and even in the newer property these receptacles are so constructed as to present all the chief faults of the old-fashioned middenstead. They are of large size (about 8 feet by 4 feet), sunk some 3 feet below the level of the ground, and of porous material. Excavated in a damp soil they are not unfrequently flooded to overflowing with surface water, and where this is not the case their contents are habitually wet. They are emptied at irregular intervals by contractors in the service of the Authority. The solid contents are thrown on to the bare surface of the back lanes to await the arrival of the scavengers' carts, while the liquid remains in or about the middenstead. The people generally complain much of this state of things, saying that they are prevented from opening their back doors and windows by the foul odours. One woman, living in Autumn Street, quite a new street, but one that has already suffered much from preventable sickness, attributed her indisposition, from which she was just recovering, to the excessively offensive condition of the back premises of the dwelling, and these I found on inspection were partially flooded by liquid oozing from a neighbour's middenstead.*

The dangers to which the inhabitants of the newer localities are exposed in this connexion might have been avoided had the Authority paid the least attention to the enforcement of their own byelaws, for by the latter (confirmed by the Local Government Board in July 1886) a proper and safe method of privy construction is duly prescribed. So little, however, do the Authority recognise this that in order to obviate, as it is supposed, the intolerable nuisance of a flooded middenstead, the futile and long since discredited plan of *draining* that receptacle by a drain communication with the common sewer has of late been proposed, and this although the plan is expressly forbidden by their own byelaws.†

The house accommodation of the district is of two classes, the old and the modern. Of the latter the cottages have always through ventilation, and the bedrooms are either two or three in number. The rooms are, however, for the most part very small, and one of the bedrooms is generally unprovided

* Amongst the deaths registered as occurring in this street in 1888 (during the first part of which only a portion was, I understand, occupied), and in the first quarter of 1889, are the following:—One from diphtheria, one from “croup,” one from typhoid fever, one from tubercular meningitis, and one from pneumonia.

† If the Horwich Sanitary Authority would inquire into the experience of neighbouring towns in this matter they would find that the only available remedy for the danger and nuisance connected with the old privy-midden is the abolition of that form of closet, and failing a proper water carriage system or proper dry-earth closet arrangements, the substitution of some form of privy that will combine the following requisites:—Small size, necessitating frequent emptying; situation and construction that will obviate the risk of soakage and absorption of foul matter. The experience of the neighbouring town of St. Helen's may be referred to for example. There, following an inquiry by the Board in 1882, as to the continued prevalence of typhoid fever, the Authority decided to abandon the system of privy-middens—a system upon the improvement of which exactly the same futile attempts as are now being made at Horwich had previously been wasted—and to introduce the pail system. Now 3,255 pails or tubs are in use in that town. The Medical Officer of Health reports that the change “has wrought wonders in its sanitary condition,” and that owners of property (who at first opposed it by every means in their power), and occupiers alike, welcome it as one that is much to their interest.

with a fireplace, and is often (contrary to the provisions of the byelaws in such cases) without special means of ventilation also. In the construction of houses the byelaw (No. 10) requiring the site to be covered with a layer of concrete, has been universally neglected, and this although the soil is so wet that, as I saw myself, the small necessary excavations for laying the foundations are often flooded with surface water. Even the very simple and ordinary precaution of providing damp-proof courses in house walls (required by another byelaw) is often neglected, or is so imperfectly observed as to render the work valueless; and the result is that in a number of houses evidence is already seen of dampness from the foundations. Many of the yards of these new buildings are unpaved, and some of them slope upwards from the site of the building. Wash-houses are only occasionally provided, so that the tenants have to use their small in-door kitchens for this purpose; the closet accommodation, placed in yards of the minimum proportions prescribed by the byelaws, is such as I have described.

In much of the older cottage property dampness is likewise a common feature; and both dilapidation and want of proper room ventilation are occasionally met with. One dwelling I saw at Higher Barn, where these defects existed, had, I was told, been reported as unfit for habitation by the Medical Officer of Health, but was still occupied. In this house the following deaths had occurred: One from bronchitis, two from scarlatina, one from some wasting infantile disease, and one from "croup" in the 14 months between May 1887 and July 1888. At the time of my visit one of the surviving children was just recovering from an attack of rheumatic fever, a disease which, as is well known, is extremely apt to leave a child permanently disabled. The taking of lodgers in these cottage houses is a very common practice, and accordingly a condition verging on overcrowding in them is frequent. Overcrowding of a gross sort is said to be less common now than on the first influx of population. No attempt has been made to register "houses let in lodgings."

The common lodging-houses, of which there are reported to be only three in this district, require to be registered and properly regulated. One that I visited was overcrowded; the room ventilation was defective, and the closet accommodation insufficient.

The water supply of the town is now derived from two general sources, while the outlying localities are dependent upon local wells and springs. Of the town sources of supply, one is from the reservoirs of the Blackrod Sanitary Authority, and is the surface water of elevated moorland; and the second, obtained at the time of scarcity of the other in 1887, is from adits driven by the side of old colliery workings situated likewise in the high moorland district above the town. Both waters afford satisfactory results on analysis, although that from the last-named source is harder than the other. The two supplies are delivered on different days to all parts of the town, and on the constant service system.

I was only able to make a partial inspection of these sources of supply, and as regards the Blackrod water, without the assistance of the managing official. So far as it went my inspection revealed no immediate danger of pollution in either case; although, as regards the surface water, the area of collection evidently requires to be jealously guarded from possible contamination by cattle, and perhaps from matters that might be washed by heavy rains from the precincts of two or three dwellings.

Certain of the outlying localities are insufficiently provided with water. At Higher Barn, an outlying hamlet, the inhabitants have to go nearly half a mile for a wholesome supply.

The dairies, cowsheds, and milkshops are reported to be registered, but require proper regulation. One I visited had direct communication both with living and sleeping rooms; direct drain communication existed within it, and the water supply was insufficient.

The slaughter-houses, of which there are reported to be five in the town, are unsatisfactory. One I found with direct (inclosed) communication with a dwelling. Another, with boarded floor, ill-lighted and ill-ventilated, was beneath a corn warehouse; and a third, small, ill-ventilated, and with

dilapidated floor. In certain cases, also, nuisance was caused by the accumulation of manure and offal.

Sanitary Administration.—The Medical Officer of Health, who is in private practice in the district, receives a salary of 20*l.* only, half of which is repayable out of the county fund. His reports show a fair appreciation of the wants of the locality; but in important respects his advice has not been acted upon. The Inspector of Nuisances is also collector of the general district rate and of water rates. His salary of 20*l.* per annum as Inspector of Nuisances is insufficient for the now largely increased duties. The Authority have not been successful in securing the due execution of contracts as to private and street improvements; and their administration of their own byelaws has, in important particulars already referred to, been lamentably inefficient.

The district is wanting in organised methods for dealing with spreading diseases. Beyond the recording of fatal cases, no system of notification of infectious disease is in force; and the Medical Officer of Health receives little voluntary assistance in this respect from the other medical practitioners. The Authority have no hospital or disinfecting apparatus. On two or three occasions small-pox patients, and on two or three other occasions cases of scarlatina, have been sent to the workhouse hospital at Bolton; and infected clothing has occasionally been sent to the same town for disinfection. The Authority supply chemical disinfectants gratuitously; and in certain cases the Inspector of Nuisances has himself fumigated houses.

THE WESTHOUGHTON URBAN SANITARY DISTRICT.

This district is situated for the most part upon the clay of the coal measures, the inhabitants being engaged chiefly in mining industries, and also in cotton and silk factories.

The district differs from Horwich in being one of much slower growth. In 1871 the population was 6,609; in 1881, 9,197; and for 1888 it is estimated at 10,400. The houses, too, are more scattered, and a larger proportion of them are situated along the paved (although very rough) highways. The by-streets, like those in Horwich, are mostly unmade, but they are altogether less considerable in number and extent, and very much less cut up by heavy traffic resulting in the other district from building operations. Their condition, nevertheless, leads to much discomfort and unnecessary dampness, and calls for the speedy attention of the Authority. A scheme for their improvement was abandoned some few years ago owing to the opposition, I am told, of owners of property, and this very necessary work has since received no attention.

By far the greater part of the district is sewered, and a scheme is on foot for completing the work throughout. The sewers, which have been constructed at intervals since 1873, are mainly of pipes. They are reported to have a fair gradient, and, on the whole, are fairly ventilated. They converge to two separate outfalls, and the small scheme in contemplation necessitates a third. The south farm outlet serves the town itself and three fourths of the whole district. Here, after passing through settling tanks, the sewage is run over land. A considerable quantity appears to remain on the surface, owing, no doubt, to the stiff clay of the soil, but the land is well removed from houses and is of considerable extent. I heard of no complaints either of the farm or of the brook into which the effluent water flows. The second farm, to the south-west, receives comparatively little sewage.

Private drains are stated to be nearly all of socketed pipes. Very few internal connexions (by kitchen slop-stone or by cellar gullies) now exist; but the work of disconnection has been carried out in such a way that considerable soakage of liquid sewage on to the unpaved yard surfaces about gullies is apparent. The ventilation of private drains is insufficiently provided for.

As at Horwich, large privy middens are almost universal, and are still being erected. They are deep as well as large, often open and sloppy, and some of them are said to be connected by drains with the sewers. The Authority make no provision for the removal of solid excreta and refuse, and

great difficulty is often experienced by householders in fulfilling this duty. Reform in this direction is greatly needed.

Many of the houses of the district are very damp. In the case of new houses the site is never covered with concrete; and even the provision of a damp-proof course in the walls, which latter is required by the byelaws, is sometimes neglected. Some of the houses are small, ill-ventilated, and dirty, and a certain number dilapidated. Over-crowding does not appear to be frequent, and the taking of lodgers is a practice much less commonly engaged in than at Horwich. There are no common lodging-houses in the district.

The general water supply is from the reservoirs of the Bolton Corporation. It is stated to be a good moorland water, and the service is a constant one. Some outlying and farm houses are dependent upon local wells and ponds, most of these no doubt liable to contamination.

The slaughter-houses, of which there are seven in the district, require to be registered and further regulated. They are generally small and ill-ventilated, with more or less dilapidated floors and walls; and the arrangements for offal and manure disposal are so inadequate as to give rise to much nuisance.

The dairies, cowsheds, &c., are registered, but little beyond this is accomplished. Some of the cowsheds are very close and ill-ventilated; the milk is sometimes dealt with in places where drainage defects exist, and the water supply is occasionally open to suspicion. The Authority have not as yet made regulations under the Milkshops' Order.

Administration.—The Medical Officer of Health is in private practice, and receives a salary of 20*l.* The Inspector of Nuisances receives a salary of 20*l.*; is school attendance officer (for which a salary of 70*l.* is paid); an insurance agent, &c. He appears to have a good knowledge of his district and to be an energetic officer. The two offices of Clerk and Surveyor are combined. The Sanitary Committee meet monthly, before each meeting of the Authority, and receive the reports of the officers. The byelaws (as to new buildings, &c.), under which they are acting, date back to 1873 and need revision. The district has not been provided with any hospital for isolation of infectious disease, nor with disinfecting apparatus. The hospital at Bolton, four or five miles distant, has on one or two occasions been used for the isolation of small-pox patients. Disinfectants (carbolic acid, &c.) are supplied gratuitously by the Authority and used under the direction of the Medical Officer of Health.

LOSTOCK PARISH, OF THE BOLTON RURAL SANITARY DISTRICT.

This parish comprises the remainder of the Horwich Registration Sub-District. It is situated between Horwich and Westhoughton, on the extreme west of the Bolton rural district, and possesses a scattered population of some 800 only. The houses are supplied for the most part with water from the mains of the Bolton Corporation. Privy middens of objectionable type are in use; house yards are unpaved and often sloppy, and drain nuisances are somewhat common.

Two deaths from "croup" were registered in this parish, one in July and the other in November 1888. I could not find any connexion between them, and the sufferers occupied houses far removed from each other. They were single cases in the respective families; in one family, however, measles and chicken-pox had just before prevailed; the deceased child having herself passed through an attack of the first-named complaint.

In the neighbouring parish of Ravensworth (outside the registration sub-district under report), in a collection of houses about Lostock Junction, sore throat, that I strongly suspect to have been diphtheritic, prevailed early in the summer of 1888. Three deaths, all amongst children, were registered from "croup" during the months of May, June, and July. The conditions here, of privy accommodation and drainage, were far from satisfactory.

A death was likewise registered from croup in January 1889 in Over Hulton, another neighbouring parish. There was some suspicion in this case of connexion with a little outbreak of diphtheria (comprising cases already referred to) in the Westhoughton urban district.

I have appended certain vital statistics relating to the two urban districts.

JOHN SPEAR.

BIRTHS and DEATHS from all Causes and certain specified Diseases in the two Urban Districts of the Horwich Registration Sub-District.

HORWICH URBAN SANITARY DISTRICT.

Year.	Population.	Births.	Deaths.	Deaths under 1.	Deaths from certain Causes.								
					Small-pox.	Measles.	Scarlatina.	Diphtheria.	Group.	Whooping Cough.	Fever.	Diarrhoea.	Puerperal Fever and Pyæmia.
1878	3,700	125	69	18	1	1	2	1	1	1	1	1	1
1879	1	150	70	12	1	1	1	1	1	1	1	1	1
1880	1	114	63	14	1	4	1	1	1	1	1	2	1
1881	3,761	144	57	19	1	1	1	1	1	1	3	1	1
1882	1	98	58	11	1	1	1	1	1	1	1	1	1
1883	1	121	70	16	1	1	2	1	2	1	1	3	3
1884	1	120	70	13	1	1	1	1	1	1	1	1	1
1885	*4,000	113	80	16	1	1	1	1	1	1	1	1	1
1886	5,500	175	86	20	1	1	1	1	1	1	1	1	1
1887	8,000	224	130	37	1	6	1	1	1	1	4	4	1
1888	11,000	335	161	52	2	2	1	1	7	1	4	1	1

* Estimated.

The rate of infant mortality, measured by the proportion of deaths under 1 to 1,000 births registered, averaged in the nine years 1878-86, 120, and ranged from 80 to 144. In the two following years, after the rapid development of the town, the corresponding ratio was 155. This increase in the mortality was most noticeable in wasting diseases, meningitis, bronchitis, and pneumonia.

WESTHOUGHTON URBAN SANITARY DISTRICT.

Year.	Population.	Births.	Deaths.	Deaths under 1.	Deaths from various Causes.								
					Small-pox.	Measles.	Scarlatina.	Diphtheria.	Group.	Whooping Cough.	Fever.	Diarrhoea.	Puerperal Fever and Pyæmia.
1878	*8,300	356	209	55	1	1	21	1	3	1	5	7	1
1879	1	352	167	50	1	1	2	1	1	1	3	1	1
1880	1	344	183	41	1	1	4	1	2	1	6	2	1
1881	9,197	380	158	46	1	1	6	1	6	3	6	3	1
1882	1	339	152	36	1	3	3	1	3	1	6	4	1
1883	1	362	178	46	4	2	1	1	1	1	1	3	1
1884	1	358	178	45	1	8	1	1	1	4	2	7	1
1885	1	348	161	48	1	1	1	1	1	1	2	2	1
1886	1	363	177	54	1	10	1	1	1	3	3	7	5
1887	1	368	225	57	122	1	1	1	11	1	6	1	2
1888	*10,400	411	207	61	3	5	3	10	6	3	44	2	2

* Estimated.

† Outbreak commenced in August.

NOTE.—No account is taken in these tables of deaths amongst persons belonging to the district that have occurred in institutions (the workhouse, county asylum, or a general hospital) outside the boundaries.

RECOMMENDATIONS.

THE HORWICH URBAN SANITARY DISTRICT.

1. The Authority should take energetic action to secure the proper sewer-ing, paving, and channelling of private streets.
2. They should secure the due enforcement of the byelaws, especially those relating to the construction of privies, &c., the preparation of house foundations, and the proper protection against dampness of house walls.
3. Existing middens which are a nuisance should be dealt with, and closets constructed on principles referred to in the text of this report should be substituted.
4. Private drain connexions with the new sewers should be subject to careful supervision. Old stone drains should be discarded, and new ones constructed according to methods prescribed in the byelaws.
5. Scavenging should be systematic, and excrement and refuse should be removed from the neighbourhood of the dwellings at regular weekly intervals.
6. The beds of the small streams and gutters which now receive sewage should be cleansed so soon as the sewage is diverted from them.
7. Steps should be taken to secure a proper water supply for those out-lying localities at present inadequately provided.
8. Common lodging-houses should be registered and property regulated ; and the Authority should consider the advisability of registering "houses let in lodgings " under the provisions of section 90 of the Public Health Act, 1875.
9. The business of slaughtering should be placed under proper regulations and superintendence, and byelaws relating to slaughter-houses properly enforced. The Authority should consider the advisability of providing a public abattoir.
10. The Dairies, Cowsheds, and Milkshops Order, and the regulations made under the authority of that Order, should be carefully enforced.
11. A system of prompt notification of infectious disease should be organised, and the Authority should make adequate provision, either by themselves or in combination with neighbouring Authorities, for the speedy isolation of cases of such disease. A disinfecting chamber should likewise be provided.

THE WESTHOUGHTON URBAN SANITARY DISTRICT.

1. Large privy middens which are a nuisance should be dealt with ; closets adapted to frequent emptying and cleansing being substituted.
2. The Authority should themselves provide for the frequent systematic emptying and cleansing of the improved privies, and generally for the removal of refuse from the neighbourhood of dwellings.
3. They should require private streets, &c., to be metalled, paved, and channelled, and properly sewer-ed in the few cases where this is still required.
4. The building byelaws should be revised.
5. Houses that are damp, ill-ventilated, or dilapidated should be dealt with under the provisions of the Public Health Act, 1875.
6. House drains should be ventilated ; dilapidated yard gullies should be renewed, and the surface about dwellings should be sufficiently paved to prevent soakage of foul matters into the soil and to facilitate the removal of impurities.
7. The local water supplies of outlying farmhouses and other dwellings should be investigated with a view to the closing of polluted wells, &c.
8. Dairies, cowsheds, and milkshops, and slaughter-houses should be placed under proper regulations.
9. Adequate provision should be made, either by separate action or in com-bination with neighbouring Authorities, for dealing with cases of infectious and epidemic disease.